

### **REMARKS**

This is a full and timely response to the outstanding final Office Action mailed April 27, 2009. Reconsideration of the application and allowance of presently pending claims, are respectfully requested.

#### **A. Present Status of Patent Application**

Claims 20-31 remain pending in the present application.

#### **Drawings**

Applicant notes that the drawings filed Apr. 20, 2004 have been accepted.

#### **B. Response to Action**

1. Claims 21 and 24 have been objected to because of the use of the term "vibrating aperture-type" nebulizer, of which the word "type" is allegedly unclear as not defining what is included or excluded.

Claim 21 has been withdrawn, but some limitations from claim 21 have been amended into claim 20, including a vibrating aperture nebulizer.

The Applicant has included references to an issued U.S. patent and copending U.S. patent applications at paragraph [0032] of the present application. The references are included below:

Vibrating aperture-type nebulizer apparatus are preferred for the practice of this invention, for example, as described in detail in U.S. Pat. No. 6,615,824, issued September 9, 2003, and in copending U.S. Patent Application Ser. Nos. 10/465,023, filed June 18, 2003, and 10/284,068, filed October 30, 2002. The entire disclosures of said patent and applications are incorporated herein.

These documents describe what a “vibrating aperture-type” nebulizer is. In short, taken from U.S. Pat. No. 6,615,824, and not to be limiting in any way on the present claimed invention, a “vibrating aperture-type” nebulizer may be described as:

[A] nebulizer which delivers a nebulized fluid to the tubing section for inhalation by a patient on the ventilator. The nebulizer has a vibrating element having a front side, a back side and a plurality of openings... Conveniently, the source of fluid may include a capillary feed system which provides fluid to the back side of the vibrating element, and the vibrating element may comprise a ring-shaped piezoelectric element. The openings in the vibrating element may be sized to eject liquid droplets such that about 70% or more of the droplets by weight have a size in the range from about 1-5 micrometers.

Therefore, by including by reference the above mentioned patent documents, the Applicant has identified what a “vibrating aperture-type” nebulizer is, and has also therefore defined what a “vibrating aperture-type” nebulizer is not.

However, to expedite prosecution, the Applicant has amended claims 20 and 24 to include the term “vibrating aperture nebulizer,” which is a concise and thorough definition of the article being claimed. Accordingly, the Applicant respectfully requests withdrawal of the objection.

## 2. Claim Rejections Under 35 U.S.C. § 112, second paragraph.

Claims 20-31 have been rejected as allegedly unpatentable under 35 U.S.C. § 112, second paragraph, for allegedly failing to particularly point out and distinctly claim the subject matter which the Applicant regards as his invention.

Specifically, the Examiner has stated that claims 1 and 24 include the term “in close proximity.” However, since claim 1 is no longer pending, the Applicant assumes that claim 20 is being rejected on the basis of the inclusion of the term “in close proximity.” Claims 20 and 24 have been amended to remove the term “in close

proximity.” In these claims, the amended portions include language that is more specific to the distance from the patient interface device, as described and having full support in the specification, at page 12, lines 27-30. Accordingly, the Applicant respectfully requests withdrawal of the rejection.

3. Claim Rejections under 35 U.S.C. § 103(a) over Bird (US 6,581,600).

Claims 20, 29, 30 have been rejected under 35 U.S.C. § 103(a) over Bird. The analysis of obviousness was set forth in *Graham v. John Deere*, 383 U.S. 1, 148 USPQ 459 (1966). In order to establish a *prima facie* case of obviousness, three basic criteria must be met:

First, there must be some *suggestion or motivation*, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the teachings of the references. Second, there must be a *reasonable expectation of success*. Finally, the prior art reference or combined references must teach or suggest *all the claim limitations*. *The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art*, and not based on applicant's disclosure (*In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991); *emphasis added*).

The Applicant respectfully traverses the rejection as failing the *Graham* test.

Regarding independent claim 20, the rejection fails at least the third element of the *Graham* test. Regarding the third element of the *Graham* test, to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). “All words in a claim must be considered in judging the patentability of that claim against the prior art.” *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

The Examiner has contended that Bird teaches a pressure circuit and a respiratory circuit. The Applicant respectfully disagrees. The system of Bird is that of a

closed circuit, comprising an inspiratory limb (tube 78), and expiratory limb (tube 88), both of which are coupled at one end to a ventilator (916), and at the other end to a junction device, or mixer (59). (See Bird column 5, lines 46-62). The patient is connected via an appropriate patient interface, e.g. endotracheal tube or cannula at outlet 68. Air thus runs, at a relatively constant pressure and flow, from the inspiratory port 17 of the ventilator, through the tubing 78, into the mixer 59, and thence to the patient's lungs. Return gases from the patient exit the lungs, enter the mixer 59, into the expiratory tube 88 and back to the expiratory port 18 of the ventilator. This defines a single closed circuit. The fact that a nebulizer 56 is fluidically coupled to the mixer 59 by a tube 123 (and by body 111) does not alter the fact that there is a single-pressure closed circuit. The tube 123 only serves to permit the nebulizer to be positioned remotely; it does not constitute a separate pressure circuit.

The Examiner has responded to this argument by stating that Bird does teach a pressure generating circuit and a respiratory circuit. The argument is articulated as follows: "Regarding the pressure generating circuit and respiratory circuit claimed, Bird clearly describes a high-volume ventilator (16) for the first circuit (78) and a second percussive ventilator (21) which is connected to the nebulizer and tube (123) forming the respiratory circuit." (See Final Office Action, dated Feb. 27, 2008, page 8, lines 2-5). However, this argument is misplaced. Both the high-volume ventilator (16) and the percussive ventilator (21) exist on the same closed circuit. In contrast, the claimed invention requires a pressure-generating circuit that contains a first gas flow of sufficiently high-volume to maintain positive pressure in the system and a respiratory circuit that contains a second gas flow of lower volume than the first gas flow. The Examiner counters this argument by stating the following:

Figure 1 of Bird shows that the respiratory circuit (which is shown to be in close proximity to the patient interface device and would avoid dilution of the aerosolized medicament that is delivered to the patient's respiratory system, as compared to the connection being made upstream on tube 78) is separate from a high flow gas line and no additional pressure is maintained at this gas line, thus a

second gas flow through tube 123 is inherently lower volume than the first flow.

However, the fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993); *In re Oelrich*, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981). Rather, to establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.' *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (citations omitted). In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original).

Applying the foregoing rules to the present rejection, the lack of any indication of how the claimed features not literally disclosed in Bird are inherently present renders the rejection of claims 20, 29, 30 improper.

In addition, claim 20 has been amended to require that an aerosolized medicament be introduced into the second gas flow by a vibrating aperture nebulizer coupled to the respiratory circuit, wherein the nebulizer is positioned and configured to avoid dilution of the aerosolized medicament that is delivered to the patient's respiratory system. This limitation is not found in Bird, and therefore the rejection violates the third element of the *Graham* test. Reconsideration and allowance of claim 20 is respectfully requested on this basis alone.

4. Claim Rejections under 35 U.S.C. § 103(a) over Bird in view of Davison (GB 2,272,389).

Claims 21-28, 31 have been rejected as being allegedly unpatentable under 35 U.S.C. § 103(a) over Bird in view of Davison.

Claim 21 has been withdrawn from consideration. With respect to the rejection of claims 22-28, 31, based in whole or in part upon Bird, the same arguments presented in support of the allowance of claims 20, 29, 30 above are applied with respect to the rejection of claims 22-28, 31.

Davison merely describes a vibrating mesh-type nebulizer, and does not teach, suggest, or disclose a method of respiratory therapy. In particular, Davison does not teach, suggest or disclose a method of respiratory therapy comprising at least the steps of providing a pressure-assisted breathing system having a pressure-generating circuit and a respiratory circuit adapted to be coupled to a patient interface device, wherein the pressure-generating circuit contains a first gas flow of sufficiently high-volume to maintain positive pressure in the system and wherein the respiratory circuit contains a second gas flow of lower volume than the first gas flow, as claimed by the Applicant. Davison is limited to describing a self-contained aerosolization apparatus, which has utility alone for inhalation therapy. For these reasons, Davison does not, and can not teach ventilator respiratory circuits, nor a pressure-generating circuit and a respiratory circuit, nor nebulizer placement therein. However, the Examiner has used Davison merely to allegedly show a vibrating mesh-type nebulizer.

The Applicant points out that claims 22-28, 31 depend from claims 20 and/or 24. Due to their dependence, the claims incorporate all of the limitations of claims 20 and/or 24. Therefore, each claim requires that an aerosolized medicament is introduced into a pressure-assisted breathing system at a location outside the high-volume flow of gas in the pressure-generating circuit. This step avoids the dilution of the aerosolized medicament by the high-volume gas flow in the pressure-generating circuit and results in an increased amount of aerosolized medicament delivered to the patient, and is not shown in either reference, alone or in combination. Accordingly, reconsideration and allowance of claims 22-28, 31 is respectfully requested.

Even assuming, *arguendo*, that it would have been obvious to combine the teachings of Bird and Davison as proposed by the Examiner, such combination does not result in the invention of amended claims 22-28, 31 because the combination fails,

at least, to include the step of introducing the aerosolized medicament into the system at a location outside the high-volume gas flow of the pressure-generating circuit of the system, and at a distance sufficient to avoid the dilution of the aerosolized medicament and/or provide an acceptable efficiency of delivering medicament to the patient's respiratory system.

The Examiner has responded to this argument by stating that these elements are not claimed. Specifically, the Examiner stated that: "(i.e., the step of introducing aerosolized medicament into a location outside the high volume gas flow in the pressure-generating circuit, such as the respiratory circuit, thereby avoiding dilution of the aerosolized medicament and increasing the amount of aerosolized medicament delivered to the patient's respiratory system) are not recited in the rejected claim(s)." The Applicant finds it very hard to believe that the Examiner is not able to find these limitations in the claims.

The Applicant respectfully disagrees with the Examiner's interpretation of the claims, and notes that in claim 24, this arrangement is described precisely as argued by the Applicant. Claim 24 requires (emphasis added):

A method of delivering a surfactant to a patient's respiratory system which comprises the steps of:

providing a CPAP system having a pressure-generating circuit with a first gas flow of sufficiently high volume to maintain continuous positive airway pressure in the system, a respiratory circuit connecting the pressure-generating circuit to a patient interface device, wherein the respiratory circuit contains a second gas flow of lower volume than said first gas flow, and a vibrating aperture nebulizer coupled to the respiratory circuit at a distance from the patient interface device sufficient to provide an acceptable efficiency of delivering a liquid surfactant to the patient's respiratory system;

introducing the liquid surfactant into the nebulizer;  
aerosolizing the surfactant in the nebulizer ; and

entraining the aerosolized surfactant into the second gas flow of the respiratory circuit to avoid dilution of the aerosolized surfactant delivered to the patient.

Each of the underlined portions of claim 24 indicate a different limitation which the Examiner has alleged are not present except in the Specification. From review of the claim, this statement appears to be inaccurate. There are two separate circuits, one of higher volume gas flow, and one of a lower gas flow. The medicament is introduced into the lower gas flow circuit, and therefore, the aerosolized medicament is introduced into the system at a location outside the high-volume gas flow of the pressure-generating circuit of the system, since it is introduced in the second gas flow, as described above. Therefore, the Examiner's argument that this limitation is not included in the claims is improper, and the rejection must be removed.

In *Takeda Chemical Industries v. Alphapharm*, No 2006-1329 (Fed. Cir. 2007), the Federal Circuit Court affirmed the District Court's finding of nonobviousness of a compound claim. The District Court found that the patentee's (*Takeda*) claim was nonobvious both because there was no motivation in the prior art references to select the compound that was patented, and because the prior art taught away from the use of such compound. The Federal Circuit affirmed, noting that the *Graham* analysis remains applicable post *KSR*, and that at least

in cases involving new chemical entities, it remains necessary to identify some reason that would have led a chemist to modify a known compound in a particular manner to establish *prima facie* obviousness of the claimed compound.

*Takeda* at page 10.

With specific reference to teaching away, the Court stated that "any suggestion to select compound b [the NCE] was essentially negated by the disclosure of the Sodha II reference". (See *Takeda*, at page 13).

For at least the reason that Bird teaches a remote nebulizer placement, the *Takeda* analysis precludes a finding that Bird, or Bird combined with Davison, can render the Applicant's claims *prima facie* obvious.

Unobviousness of applicant's claimed invention is further exemplified by claims 23 and 26-28 which point out the unexpectedly high (compared to the prior art) delivery efficiencies realized from the practice of one or more embodiments of the practice of applicant's invention. As set forth in these claims and described in the specification (e.g. paragraphs [0040] – [0043]), considerably more of the aerosolized medicament, such as surfactant, may delivered to the patient using the method of the claimed invention. Thus only about 4 ml of liquid is required to provide a therapeutic dose to a 1 kg infant. These unexpected results are further evidence of the unobviousness of the present invention.

With further regard to the dependent claims 22-23, 25-31, as the independent claims 20 and 24 are believed to be allowable over the combination of prior art, and the dependent claims incorporate all the limitations of the independent claims, then the dependent claims are allowable as a matter of law. If an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

In view of the foregoing, the Applicant submits that pending claims 20-31 satisfy the requirements of patentability and are therefore in condition for allowance. Reconsideration and allowance of claims 20-31 and withdrawal of all rejections is respectfully requested and a prompt mailing of a Notice of Allowance is solicited.

In the event a telephone conversation would expedite the prosecution of this application, the Examiner may reach the undersigned at (408) 971-2573. For payment of any additional fees due in connection with the filing of this paper, the Commissioner is authorized to charge such fees to Deposit Account No. 50-1351 (Order No. NVARP003).

Respectfully submitted,

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